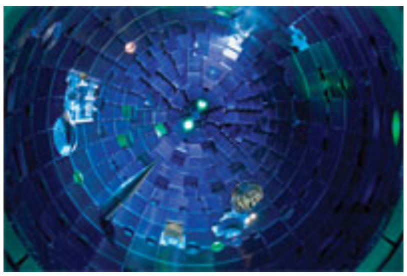
LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Jan. 13-17, 2014.

the Atlantic — YIELD TO HIGH ENERGY



This view of NIF's target chamber shows the target positioner being inserted. Scientists at the National Ignition Facility are working to create fusion.

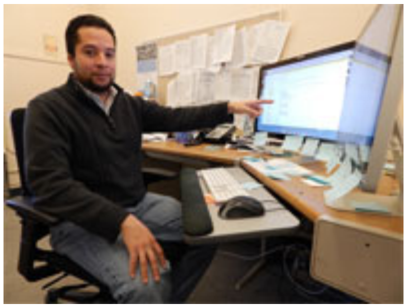
Scientists at the National Ignition Facility (NIF) are trying to achieve self-sustaining nuclear fusion -- to create a miniature star on Earth.

The core of the NIF is a house-sized spherical chamber aiming 192 massive lasers at a tiny target. One recent laser experiment focused nearly 2 megajoules (the energy consumed by 20,000 100-watt light bulbs in one second) of light energy onto a millimeter-sized sphere of deuterium and tritium in a 16-nanosecond pulse.

The resulting energetic output, while far short of being a self-sustaining reaction, set a record for energy return, and has scientists hopeful as they fine-tune the targeting, material and performance of the instruments.

To see more, go to The Atlantic.

CONTRA COSTA TIMES ContraCostaTimes.com — AND THE WINNER IS . . .



LLNL’s Miguel Morales recently received the Presidential Early Career Award for Science and Engineering.

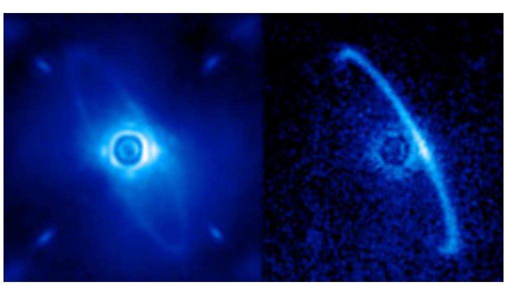
President Barack Obama has honored Lawrence Livermore physicist Miguel Morales for his cutting-edge research in condensed matter physics.

Morales, who joined the Lab as a staff scientist in 2010, was named as one of the 2014 Presidential Early Career Award for Science and Engineering (PECASE) winners. The award, issued to 102 recipients nationwide, is the highest bestowed by the U.S. government to researchers in the early stages of their careers. It comes with a stipend distributed over five years; past recipients have received up to $50,000 annually.

Morales, a native of Puerto Rico, earned bachelors of science degrees in theoretical physics and mathematics from the University of Puerto Rico in 2004, and a Ph.D. from the University of Illinois Urbana-Champaign in 2009. As part of his work at the Lab, Morales studies materials at extreme pressure and temperature on some of the world's most powerful supercomputers.

To read more, go to the Contra Costa Times.

DiscoveryNews. THEY'RE OUT THERE



Gemini Planet Imager's first light image of the light scattered by a disk of dust orbiting the young star HR4796A.

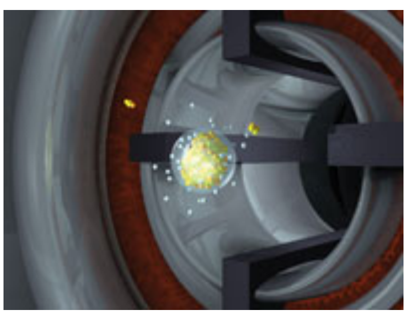
A new instrument, attached to one of the most powerful telescopes in the world, has opened its 7infrared eye for the first time, taking snapshots of a nearby planet orbiting another star and a ring of proto-planetary stellar dust.

The sophisticated car-sized instrument, called the Gemini Planet Imager (GPI), is attached to the 8-meter Gemini South telescope in Chile and represents a new era in exoplanetary discovery. Lawrence Livermore scientists led the effort in the design engineering, building and optimization of the instrument, which has been in development since 2003. Not only can it resolve the dim light from an exoplanet orbiting close to its parent star, it analyzes the planet's atmospheric composition and temperature.

"Most planets that we know about to date are only known because of indirect methods that tell us a planet is there, a bit about its orbit and mass, but not much else," said Bruce Macintosh of Lawrence Livermore, who led the team that developed GPI. "With GPI we directly image planets around stars -- it's a bit like being able to dissect the system and really dive into the planet's atmospheric makeup and characteristics."

To read more, go to [Discovery].

ABC Australian Broadcasting Corporation THE PERIODIC TABLE JUST GOT A LITTLE BIGGER



An accelerated calcium-48 ion collides into an americium-243 target atom and creates the new 115 element that begins decaying with the emission of alpha particles into element 113.

While 2012 was the year of the Higgs boson, 2013 will be quietly remembered as the year Ununpentium -- or element 115 -- was confirmed to exist.

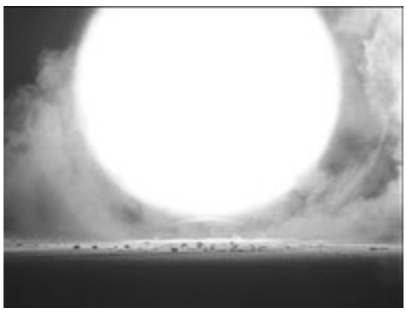
Despite having first been created in Russia's Joint Institute for Nuclear Research and the US Lawrence Livermore National Laboratory, it took scientists another 10 years to recreate these short-lived heavy atoms. The atoms were created at the GSI research facility in Germany, by blasting calcium atoms at 90 percent the speed of light at a foil of americium atoms.

Within a few milliseconds, element 115 decayed into element 113, which in turn broke down into smaller parts.

While the result has no obvious application, it's seen as another step toward our fundamental understanding of the nature at the atomic level.

To read more, go to [ABC Science].

livescience GIMME SHELTER



Nuclear explosions produce radioactive ash and dust that must be avoided to minimize risks of radiation poisoning and cancer. Image courtesy of U.S. Defense Threat Reduction Agency.

If you live within about 20 miles of a small-scale nuclear attack, there are certain protective measures you can take to improve your chances of survival.

Those findings are detailed in a new report by Lawrence Livermore's Jason Dillon, who described the optimal escape strategies for small-scale nuclear explosions.

The best way to protect against the radioactive dust and ash of nuclear fallout is to seek shelter underground. To help simplify this decision process, Dillon conducted mathematical analyses based on existing data on the threats induced by small-scale nuclear explosions to streamline rules people can abide by to protect themselves from fallout.

To read more, go to [Live Science].

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance. To send input to the Livermore Lab Report, send e-mail